

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Currently Amended) A communications system, comprising:

a base station configured to output ~~[[a]] first digital in phase and quadrature phase (I/Q) signal signals;~~

an optical connecting unit configured to convert the first digital I/Q ~~signal signals~~ into an optical ~~signal signals~~ and output the converted optical ~~signal signals~~ through an optical cable; and

an optical base station coupled to receive the optical ~~signal signals~~ through the optical cable and configured to convert the optical ~~signal signals~~ into ~~[[a]] second digital I/Q signal signals,~~ and convert the second digital I/Q ~~signal signals~~ into ~~[[a]] first RF signal signals~~ for transmission.

2. (Currently Amended) The system of claim ~~[[I]]~~ 1, wherein the optical base station comprises:

an optical transceiver configured to convert the optical ~~signal signals~~ received through the optical cable into the second digital I/Q ~~signal signals;~~

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a multiplexer/demultiplexer unit configured to demultiplex the second digital I/Q ~~signal~~ signals outputted from the optical transceiver;

an up-converter configured to convert and filter ~~[[an]]~~ output ~~signal~~ signals of the multiplexer/demultiplexer unit and output the first RF ~~signal~~ signals;

a High Power Amplifier (HPA) configured to amplify the first RF ~~signal~~ signals outputted by the up-converter; and

a duplexer configured to filter the amplified first RF ~~signal~~ signals and provide the filtered output to an antenna.

3. (Currently Amended) The system of claim 2, wherein the optical base station further comprises:

a plurality of duplexers configured to remove a noise component of ~~[[a]]~~ second RF ~~signal~~ signals collected by a corresponding plurality of antennas;

a plurality of Low Noise Amplifiers (LNAs) configured to amplify the second RF signals outputted from the plurality of duplexers; and

a plurality of down-converter units configured to band-pass filter, down-convert and analog to digital convert, the second RF signals outputted from the plurality of LNAs.

4. (Original) The system of claim 3, wherein the optical base station further comprises a clock unit configured to provide a synchronous signal to the multiplexer/demultiplexer unit.

5. (Original) The system of claim 4, wherein the optical base station further comprises a reference clock unit configured to provide the synchronous signal of the clock unit to the up-converter unit and the plurality of down-converter units.

6. (Original) The system of claim 2, wherein the antenna comprises a diversity antenna.

7. (Currently Amended) The system of claim ~~[[I]]~~ 1, wherein the optical connecting unit comprises:

a multiplexer/demultiplexer configured to multiplex the first digital I/Q-~~signal~~
signals;

an optical transceiver configured to convert ~~[[an]]~~ output ~~signal~~-signals of the multiplexer/demultiplexer into the optical ~~signal~~-signals and transmit the optical ~~signal~~-signals through the optical cable to the optical base station; and

a clock unit configured to provide a synchronous signal to the multiplexer/demultiplexer unit.

8. (Currently Amended) The system of claim 7, wherein the optical transceiver is further configured to receive ~~[[an]] optical signal~~ signals from the optical base station and convert the received optical ~~signal~~ signals into ~~[[a]] third digital I/Q signal~~ signals to be transmitted to the base station.

9. (Currently Amended) The system of claim ~~[[I]] 1~~, wherein the optical connecting unit receives the first digital I/Q ~~signal~~ signals from ~~[[a]] at least one~~ channel card of the base station.

10. (Currently Amended) The system of claim ~~[[I]] 1~~, wherein the optical base station and the optical connecting unit are digital interface-based devices.

11. (Currently Amended) A signal transmitting method for a communications system, comprising:

converting ~~[[a]] first digital I/Q signal~~ signals outputted from a base station into ~~[[an]] optical signal~~ signals;

transmitting the optical ~~signal~~ signals through an optical cable to an optical base station;

converting the optical ~~signal~~ signals received through the optical cable into ~~[[a]] second digital I/Q signal~~ signals;

converting the second digital I/Q ~~signal signals~~ into ~~[[a]] RF-signal signals~~; and
transmitting the RF ~~signal signals~~ through an antenna.

12. (Currently Amended) The method of claim ~~[[II]]~~ 11, wherein converting the second digital I/Q ~~signal signals~~ to ~~[[a]] RF-signal signals~~ comprises:

demultiplexing the second digital I/Q ~~signal signals~~;

converting the demultiplexed ~~signal signals~~ to an analog ~~signal signals~~;

band pass filtering the analog ~~signal signals~~ to generate the RF ~~signal signals~~;

high-power amplifying the RF ~~signal signals~~; and

filtering the amplified RF ~~signal signals~~.

13. (Currently Amended) The method of claim ~~[[I2]]~~ 12, wherein demultiplexing is performed in accordance with a synchronous signal.

14. (Currently Amended) The method of claim ~~[[II]]~~ 11, wherein converting the first digital I/Q ~~signal signals~~ to the optical ~~signal signals~~ comprises multiplexing the first digital I/Q ~~signal signals~~.

15. (Original) The method of claim 14, wherein multiplexing is performed in accordance with a synchronous signal.

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16. (Original) The method of claim 11, wherein the antenna comprises a diversity antenna.

17. (Currently Amended) The method of claim 12, further comprising receiving ~~an~~ RF ~~signal~~ signals through the antenna.

18. (Currently Amended) A signal receiving method for a communications system, comprising:

receiving ~~an~~ RF ~~signal~~ signals through an antenna of a first station;

converting the received RF ~~signal~~ signals to ~~[[a]]~~ first digital electronic ~~signal~~ signals;

converting the first digital electronic ~~signal~~ signals to ~~[[a]]~~ digital optical ~~signal~~ signals;

transmitting the digital optical ~~signal~~ signals over an optical link to an optical connecting unit;

converting the digital optical ~~signal~~ signals to ~~[[a]]~~ second digital electronic ~~signal~~ signals in the optical coupling unit, the second digital electronic signals including in phase and quadrature phase (I/Q) signals; and

providing the second digital electronic ~~signal~~ signals from the optical coupling unit to a second station.

19. (Original) The method of claim 18, wherein the optical link comprises an optical cable.

20. (Original) The method of claim 18, wherein the first station comprises a remote base station and wherein the second station comprises a base station.

21. (Original) The method of claim 20, wherein the antenna comprises a diversity antenna.

22. (Currently Amended) A communications system, comprising:
means for converting ~~[[a]] first digital I/Q electronic signal signals~~ outputted from a first station into ~~[[a]] first digital optical signal signals~~;
means for transmitting the first digital optical ~~signal signals~~ to a second station;
means for converting the first digital optical ~~signal signals~~ to ~~[[a]] second digital electronic signal signals~~;
means for converting the second digital electronic ~~signal signals~~ to ~~[[a]] first RF signal signals~~; and
means for transmitting the first RF ~~signal signals~~.

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23. (Currently Amended) The system of claim 22, wherein the first digital optical ~~signal is~~ signals are transmitted to the second station using an optical cable.

24. (Currently Amended) The system of claim 22, further comprising means for amplifying and filtering the first RF ~~signal~~ signals prior to transmitting.

25. (Currently Amended) The system of claim 22, further comprising:
means for receiving ~~[[a]] second RF signal~~ signals in the second station;
means for converting the second RF ~~signal~~ signals to ~~[[a]] third digital electronic~~ signal signals;
means for converting the third digital electronic ~~signal~~ signals to ~~[[a]] second~~ digital optical ~~signal~~ signals;
means for transmitting the second digital optical ~~signal~~ signals over the optical link;
means for converting the second digital optical ~~signal~~ signals to ~~[[a]] fourth digital~~ electronic ~~signal~~ signals; and
means for providing the fourth digital electronic ~~signal~~ signals to ~~[[a]] second~~ station.

26. (Currently Amended) A signal transmitting method in a communication system, comprising:

converting ~~[[a]] digital I/Q signal-signals~~ to ~~[[an]] optical signal-signals~~ in an optical connecting unit;

transferring the optical ~~signal-signals~~ over an optical cable to a remote station; and

converting the optical ~~signal-signals~~ into ~~[[an]] RF signal-signals~~ for transmission.

27. (Currently Amended) The method of claim 26, wherein the digital I/Q ~~signal is~~ signals are received from a base station.

28. (Currently Amended) The method of claim 26, wherein converting the optical ~~signal-signals~~ comprises:

converting the optical ~~signal-signals~~ into ~~[[an]] analog signal~~;

demultiplexing the analog ~~signal-signals~~;

up converting and filtering the demultiplexed analog ~~signal-signals~~ to generate the ~~RF-signal signals~~; and

amplifying and filtering the ~~RF-signal signals~~.

29. (Currently Amended) The method of claim 26, wherein converting the digital I/Q ~~signal-signals~~ comprises multiplexing the digital I/Q ~~signal-signals~~ and inputting the

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multiplexed digital I/Q ~~signal signals~~ into an optical transceiver to generate the optical ~~signal~~
signals.

30. (Currently Amended) The method of claim 26, further comprising:
receiving ~~[[an]]~~ external RF ~~signal signals~~ through an antenna coupled to the
remote station;
converting the external RF ~~signal signals~~ to ~~[[a]]~~ second optical ~~signal signals~~;
transferring the second optical ~~signal signals~~ to the optical connecting unit; and
converting the second optical ~~signal signals~~ to ~~[[a]]~~ second digital I/Q ~~signal~~
signals.

31. (Currently Amended) A communication system, comprising:
an optical connecting unit, configured to receive ~~[[a]]~~ first digital I/Q ~~signal signals~~
and convert the first digital I/Q ~~signal signals~~ into ~~[[a]]~~ first digital optical ~~signal signals~~; and
a remote base station, coupled to receive the first digital optical ~~signal signals~~ and
configured to convert the first digital optical ~~signal signals~~ to ~~[[a]]~~ first analog RF ~~signal signals~~
for transmission.

32. (Currently Amended) The system of claim 31, wherein the base station is further configured to receive ~~[[a]] second RF analog signal signals~~ and convert the second analog RF ~~signal signals~~ to ~~[[a]] second digital optical signal signals~~, and wherein the optical connecting unit is coupled to receive the second digital optical ~~signal signals~~ and further configured to convert the second digital optical ~~signal signals~~ to ~~[[a]] second digital I/Q signal signals~~ for transmission.

33. (Currently Amended) A communication system, comprising:
an optical connection unit, configured to convert ~~[[a]] first digital I/Q signal signals~~ to ~~[[a]] first optical signal signals~~ and to convert ~~[[a]] second optical signal signals~~ to ~~[[a]] second digital I/Q signal signals~~; and

a remote base station, coupled to receive the first optical ~~signal signals~~, and configured to convert the first optical ~~signal signals~~ to ~~[[a]] third digital I/Q signal signals~~, convert the third digital I/Q ~~signal signals~~ to ~~[[a]] first RF signal signals~~, transmit the first RF ~~signal signals~~, receive ~~[[a]] second RF signal signals~~, convert the second RF ~~signal signals~~ to ~~[[a]] fourth digital I/Q signal signals~~, and convert the fourth digital I/Q ~~signal signals~~ to the second optical ~~signal signals~~.

34. (Original) The system of claim 33, further comprising an optical link coupling the optical connecting unit to the remote base station.

35. (Original) The system of claim 33, wherein the remote base station comprises a diversity antenna.

36. (Currently Amended) The system of claim 33, wherein the optical connecting unit comprises a multiplexer configured to multiplex the first digital I/Q ~~signal~~ signals and a demultiplexer configured to demultiplex the second digital I/Q ~~signal~~ signals, and wherein the remote base station comprises a demultiplexer configured to demultiplex the third digital I/Q ~~signal~~ signals and a multiplexer configured to multiplex the fourth digital I/Q ~~signal~~ signals.

37. (New) The system of claim 7, wherein the multiplexer/demultiplexer converts the first digital I/Q signals from parallel to serial.

38. (New) The method of claim 11, wherein converting the first digital I/Q signals comprises converting the first digital I/Q signals from parallel to serial.

39. (New) The system of claim 22, wherein the means for converting first digital I/Q electronic signals includes means for converting the first digital electronic I/Q signals from parallel to serial.

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40. (New) The method of claim 26, wherein converting the digital I/Q signals comprises converting the digital I/Q signals from parallel to serial.

41. (New) The system of claim 31, wherein the optical connecting unit converts the first digital I/Q signals from parallel to serial.

42. (New) The system of claim 33, wherein the optical connecting unit converts the first digital I/Q signals from parallel to serial.